

Upper Potomac River in Review - 2015

The nontidal Potomac River, generally referred to as the “Upper” Potomac, is one of Maryland’s most popular freshwater fishing destinations. Forming Maryland’s southern boundary, the upper Potomac offers fishermen more than 160 miles of warmwater fishing opportunities for smallmouth bass, walleye, muskie and channel catfish. The Inland Fisheries Division is responsible for protecting, conserving, and enhancing these popular fisheries. The Public Fishing Access Map

(<http://gisapps.dnr.state.md.us/publicfishingaccess/>) is a great tool to help decide where to go.



Smallmouth Bass

Smallmouth bass are synonymous with the upper Potomac and are found throughout the river from Allegany County to the District of Columbia as well as the tributaries. The Inland Fisheries Division monitors juvenile and adult smallmouth bass populations in the mainstem annually using a variety of tools including a summer seining survey to assess the abundance of young bass, fall electrofishing to assess abundance, size, and condition of adult bass, and fishing catch rates through periodic creel surveys, the web-based volunteer angler survey, and through tournament catch rates.

Reproduction

Natural reproduction of smallmouth bass in the nontidal Potomac River mainstem has been assessed annually since 1975 using a summer seining survey (2015 Survey Results). The geometric mean number of young bass collected per haul is used as an index of year-class strength (geometric mean is not as influenced by the very large values). The abundance and size distribution of the adult population are determined largely by the strength or weakness of year-classes.



Reproduction of smallmouth bass in the Maryland portion of the Potomac watershed in 2015 ranged from fair to excellent. Smallmouth bass reproduction on the Potomac mainstem (PawPaw, WV downstream to Seneca) was considered to be “good” with a mean of 1.9 young bass per haul, above the median value of 1.6 (Figure 1).

The number of young bass produced each year can vary greatly. Environmental factors, particularly river flow, generally have the greatest influence on year-class strength. A warming

climate will cause changes in precipitation patterns and seasonal river flow. Though highly variable from one year to the next, the average flow recorded during May at Potomac River gauges has shown an increasing long-term trend. Higher average flows during the spawning



season (May) could reduce the frequency of strong year-classes. Other factors such as intersex, disease, parasites, food availability, and competition can reduce the number of young bass.

Reproduction of smallmouth bass in one of the Potomac's larger tributaries, Conococheague Creek, was considered to be "excellent" in 2015. Unfortunately, several young bass showed signs of a myxozoan parasite infection as seen in small white cysts on the back and near the tail.

The myxozoan was identified by scientists at the USGS Leetown Fish Health Laboratory as the same species (*Myxobolus inornatus*) recently documented infecting juvenile smallmouth bass in the Susquehanna River. Alone, this parasite may not cause extensive mortality. However, the parasite results in a break in the skin that allows secondary bacterial infections to take hold that can contribute to mortality. Inland Fisheries will continue to work closely with USGS scientists during 2016 to evaluate the extent and distribution of young bass infected by this parasite in the Potomac watershed and how the parasite might influence the survival of young bass in the future. (More information on the ongoing research on smallmouth bass health in the Potomac watershed can be found here and associated references:

http://toxics.usgs.gov/highlights/edcs_bass_nests.html)

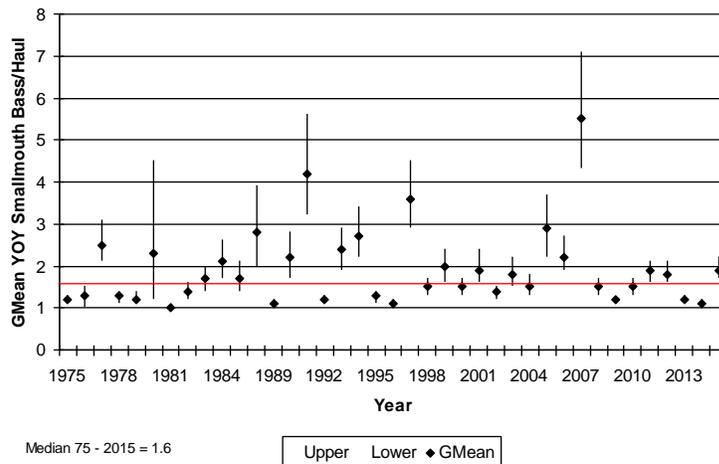


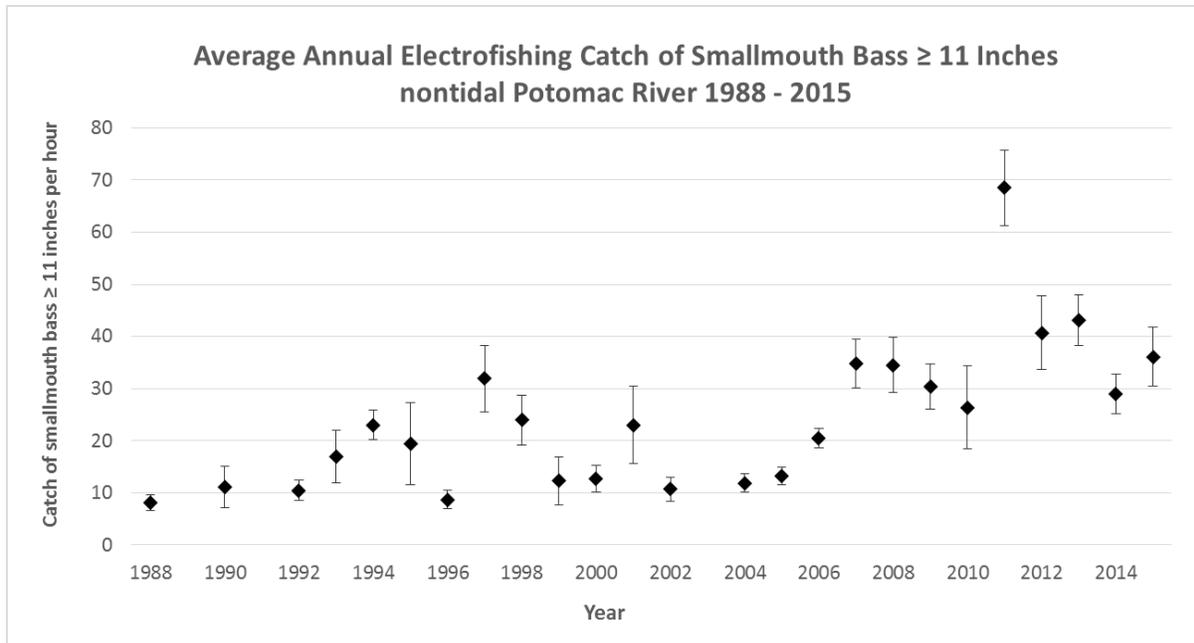
Figure 1. Annual geometric mean number of young smallmouth bass per seine haul captured from the **mainstem** Potomac River (PawPaw, WV to Seneca, MD) 1975 - 2015. 95% confidence interval. Red line is long term median value of 1.6 young smallmouth per haul.

Fall Electrofishing Surveys

During the fall of 2015, a total of 906 adult smallmouth bass (≥ 7 inches in length) were collected during 8.5



hours of electrofishing at 12 sites from PawPaw, WV downstream to Edwards Ferry for a total catch rate of 107 smallmouth bass per hour ([video link](#)). The river-wide average electrofishing catch rate of smallmouth bass ≥ 11 inches has increased over time, largely the result of



increasing voluntary angler release rates (Figure 2).

Figure 2. Average annual electrofishing catch of smallmouth bass ≥ 11 inches from the nontidal Potomac River between PawPaw, WV and Edwards Ferry, MD 1988 – 2015. Bars are standard error of means.

Biologists use standardized size classes developed by biologists across the country to classify how the sizes of fish are distributed in the population. For smallmouth bass these size classes are stock ($\geq 7''$), quality ($\geq 11''$), preferred ($\geq 14''$), memorable ($\geq 17''$), and trophy ($\geq 20''$). The percentage of Potomac River smallmouth bass occurring in the size class increments are shown in the table to the right. Bass in the 11 – 14'' size increment have increased since 2014. However, smallmouth $\geq 14''$ have declined since 2014 and are also slightly below the average for the period 2006 – 2014. The large year-classes produced during 2005 – 2007 (Figure 1) increased the proportion of larger bass in the 2011 and 2012 collections. As these fish aged and began to leave the population, the percentage of large bass has declined.

Year	Percentage of Smallmouth in Size Class			
	7 - 11''	11 - 14''	14 - 17''	17 - 20''
2006	65	22	10	2
2007	64	24	9	3
2008	62	25	8	5
2009	70	19	9	2
2010	68	24	7	1
2011	47	35	15	3
2012	49	35	13	3
2013	60	28	9	3
2014	68	19	9	4
average	61	26	10	3
95% CI	(55 - 68)	(21 - 30)	(8 - 12)	(2 - 4)
2015	66	24	8	2

Generally speaking, smallmouth bass are more abundant in the western stretches of the Potomac upstream of Dam 5 near Clear Spring with a greater proportion of the catch consisting of 7 to 11" bass (Figure 3). Conversely, the catch rate of smallmouth bass ≥ 11 inches is generally higher in the middle (Dam 5 downstream to Dam 3) and lower (Dam 3 and below) river. Nevertheless, opportunities exist to catch trophy smallmouth throughout the river.



2015 Size Distribution of Potomac River Smallmouth Bass

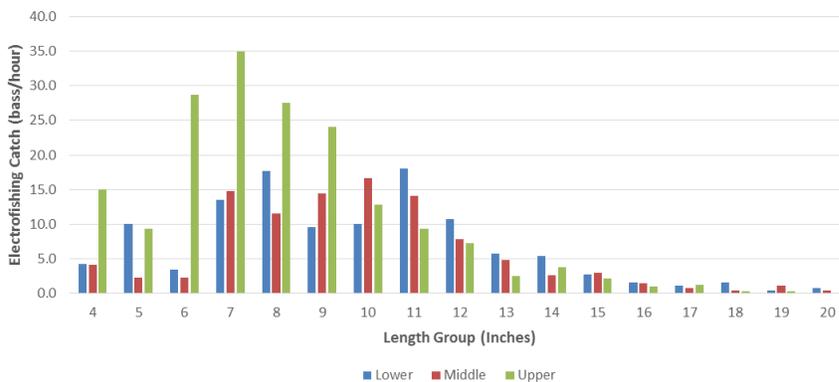


Figure 3. Size distribution of Potomac River smallmouth bass collected by electrofishing during 2015 by river segment. Upper River is PawPaw, WV downstream to Dam 5, Middle River is Dam 5 downstream to Dam 3, Lower River is Dam 3 downstream to Dam 2 (Seneca Breaks).

Volunteer Angler Survey

Combined with the annual fishery surveys, angler surveys help to provide a more complete picture of the fishery. Angler catch is an important component in evaluating fishery quality. Periodic creel surveys as well as the ongoing Potomac River Smallmouth Bass Volunteer Angler Survey available on the Fisheries Service website <http://dnr2.maryland.gov/fisheries/Pages/survey/index.aspx> are used to gather information on angler success.



Lower River	Year				
	2015*	2014*	2013*	2013	2012
Number of trips reported	20	20	23	86	119
total catch rate (bass/hr)	2.6	2.6	2.8	3.0	2.7
total ≥ 12 " catch/hr	0.82	0.94	1.3	1.1	1.1
% ≥ 12 " (≥ 12 "/total bass)	32	36	45	36	41
mean bass catch/outing	16.1	14.8	16.5	16.9	14.0
mean ≥ 12 " /outing	5.1	5.3	7.4	6.1	5.8
Av hrs fished per outing	6.3	5.6	5.9	5.6	5.2

The decline in the proportion of larger smallmouth bass documented by the annual electrofishing surveys was also reflected in recent angler surveys.

*The table to the left summarizes information from recent angler surveys. Years with an * denote information from the online Potomac River Smallmouth Bass Volunteer Angler Survey whereas data for the other years were collected by the distribution of creel cards; a comparison of both methods were available in 2013. Only data from the Lower River (downstream of Harpers Ferry, WV) are presented, since too few trips were reported through the online survey for the Middle and Upper River segments for analysis.*

Overall, total catch rates and the average number of bass caught per trip have not changed while the catch rate for bass ≥ 12 inches and the percent of bass ≥ 12 inches in the catch declined slightly.

Walleye



Since their introduction in 1989, walleye have become a popular addition to the upper Potomac River fishery. Movement towards spawning habitat during late winter and early spring begins the eagerly anticipated “walleye run”. Walleye concentrating below dams and other significant barriers attract early season fishermen anxious to start the season. The concentration of walleye also provides biologists with an opportunity to evaluate the size distribution of the population and to collect brood stock for Manning Hatchery. Fingerlings

produced from the Potomac stock are used to supplement the Potomac stock as well as other suitable waters throughout Maryland. Walleye management is focused in the 44 miles of river between Dam 5 near Clear Spring and Dam 3 near Harpers Ferry where walleye fishing has been most productive and popular with anglers.

The size distribution of walleye collected by electrofishing during the spring of 2014 and 2015 shows a desirable spread of sizes throughout the



adult population, including trophy size fish. What has been lacking, however, are juvenile fish (<15”) indicating poor recent reproduction and recruitment (Figure 4).

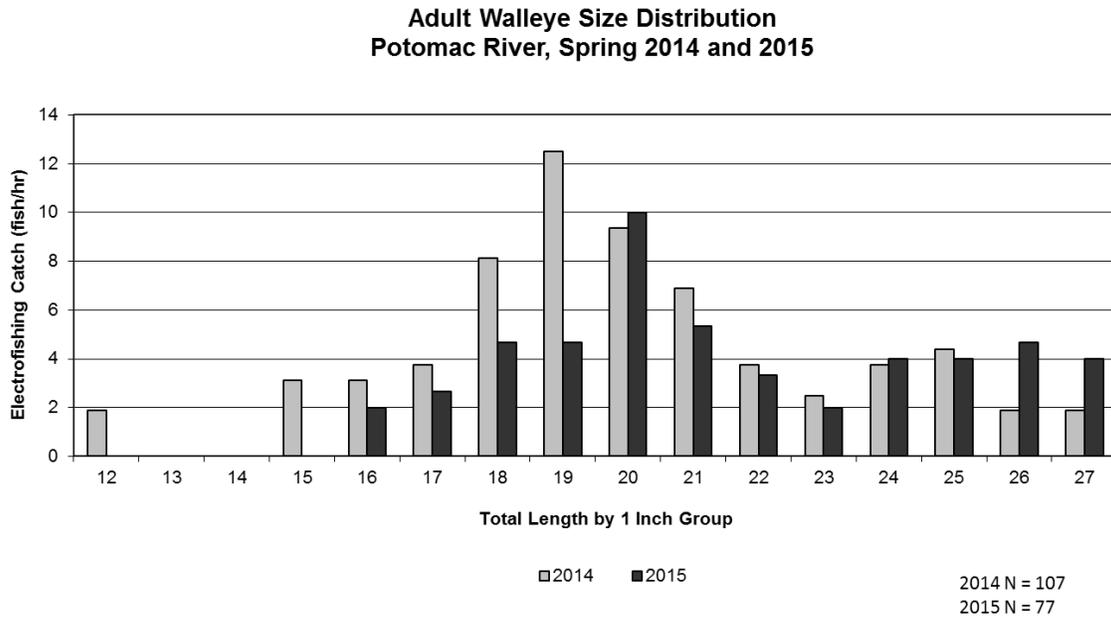


Figure 4. Size distribution of adult walleye collected by spring electrofishing from the Potomac River during 2014 and 2015.

To supplement existing reproduction, Inland Fisheries resumed stocking in 2013 with fingerlings marked with oxytetracycline, an antibiotic drug that binds to bones and will fluoresce when exposed to ultraviolet light, thus enabling biologists to distinguish stocked fish from wild fish. Identifying hatchery fish is important in evaluating the effectiveness of stocking programs. Frequent spring high water and flood events during 2013 and 2014 reduced the survival of both wild and hatchery fingerlings. Fortunately, favorable river conditions during the spring of 2015



increased survival and resulted in a strong year-class. A sample of the juvenile walleye collected during the fall electrofishing surveys revealed that 54% were hatchery fish, demonstrating that stocking made a significant contribution to the year-class. Anglers will notice these 10 – 13” juvenile walleye in the catch this spring (2016). Brood collection and walleye stocking will continue in 2016.

Muskellunge

Muskellunge (muskie) are a relative newcomer to the upper Potomac River. The “fish of a 1000 casts” has become very popular among a dedicated group of muskie chasers. Natural reproduction was first documented in 1995 and the population has expanded naturally; the original source of muskie in the Potomac is unknown.



Because muskie are naturally found in lower densities than the other popular sportfish, it is difficult to collect a sufficient number of individuals during standardized surveys for meaningful analysis. To collect data from a greater number of fish, Inland Fisheries uses information from angler-caught muskie through the Potomac River Muskie Creel Diary Program. Participating anglers are provided a creel sheet to record basic information about each fishing trip and the muskie that were caught. At the end of the year or their fishing season, the creel sheets are returned to Inland Fisheries via email or Postal Service. Participating anglers are sent a Muskie Program Volunteer cap in appreciation and to generate interest in the program. Anglers interested in participating in the program can download a creel sheet from the Volunteer Angler Surveys page: <http://dnr2.maryland.gov/fisheries/Pages/survey/index.aspx> or contact John Mullican at john.mullican@maryland.gov.

Year	2010	2011	2012	2013	2014	2015
# Muskie Caught	94	205	226	168	212	180
Angler Hrs	545	1413	2988	2633	2839	1771
Total Catch/Hr	0.17	0.15	0.08	0.06	0.07	0.10
# Trips	67	172	295	321	378	330
Hrs to Catch	5.9	6.7	12.5	15.7	13.5	9.8
# of Participants	5	10	15	16	15	13
recaptures	14	19	15	12	20	14
% recaptures	14.9	9.3	6.6	7.1	9.4	7.8
Av. muskie length	36.4	35.4	36.0	36.8	36.0	36.1

The table to the left summarizes the angler catch and trip data from the creel diary program. The catch rate increased in 2015 and muskie anglers averaged 9.8 hours to catch a muskie.

Angler catch rates for muskie are generally lowest during late summer and highest during the cooler months. Extremely cold weather during the winter reduced fishing effort during January and February whereas uncommonly mild weather in December increased effort (Figure 5).

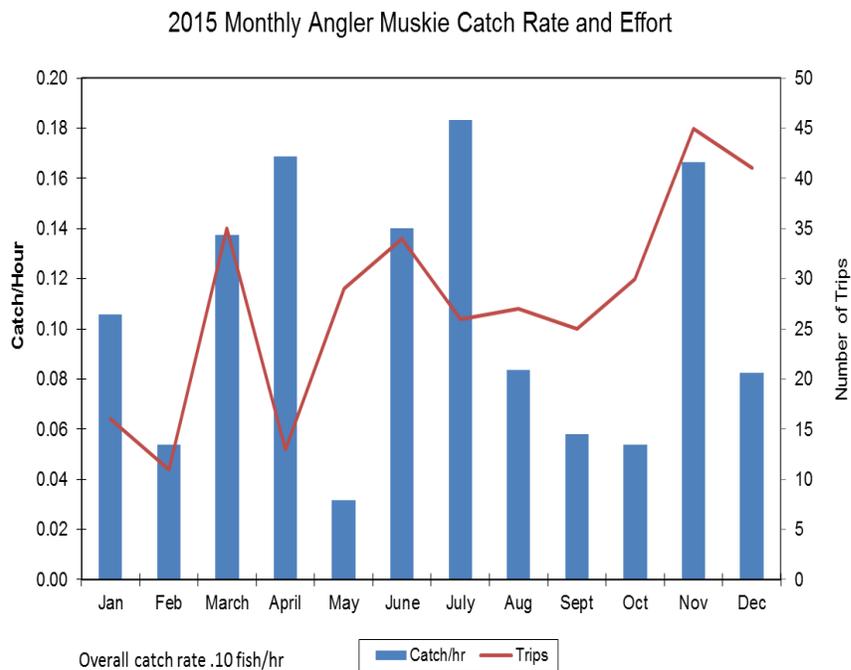


Figure 5. Monthly angler catch rates and effort recorded by the Potomac River Muskie Creel Diary Program during 2015.

The size distribution of the 180 muskie caught by anglers and reported through the creel diary program in 2015 are shown in Figure 5. Fewer muskie are represented in the 20 – 30” size category because the lures used to target muskie are large and eliminate most muskie less than 27” in length from the catch.

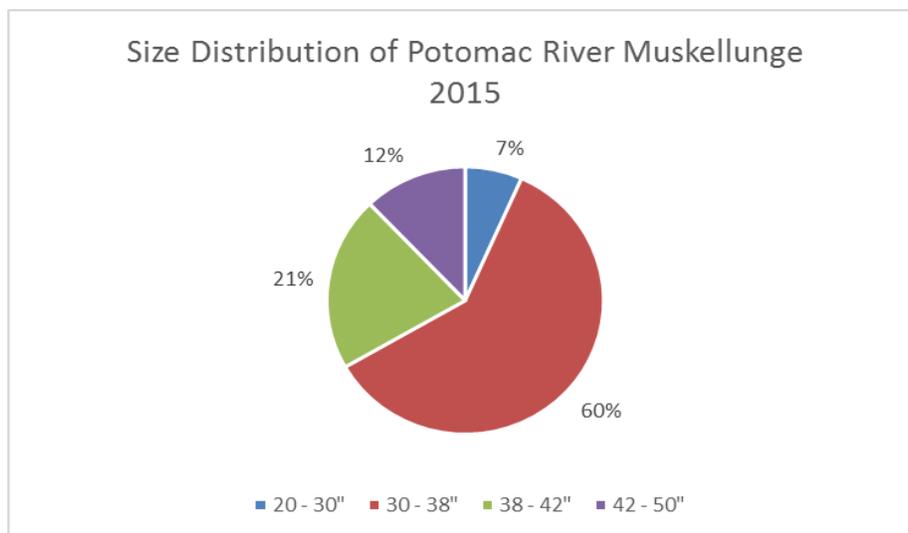


Figure 6. Size distribution of angler caught muskellunge reported from the Potomac River Muskie Creel Diary Program during 2015 (N = 180).

Inland Fisheries has an ongoing tagging project to learn more about angler catch rates. Since 1997, a total of 777 muskie have been tagged with dart tags on the left side of the dorsal fin. The total recapture rate is 37% without adjustment for tag loss or nonreporting, so it is conceivable that half of the adult muskie are eventually caught by anglers. Fortunately, voluntary release rates are extremely high and trophy size fish continue to be available (Figure 6). Several tagged muskie have been caught multiple times demonstrating good survival from catch and release fishing.



Invasive Species

Northern Snakehead



Invasive aquatic species can cause ecological and economic harm. Although firmly established in the tidal Potomac River, northern snakehead (*Channa argus*) had yet to be documented from the nontidal Potomac watershed upstream of the natural barrier provided by Great Falls. However, following reports of snakehead caught by anglers from the Chesapeake and Ohio Canal (C&O Canal) upstream of Great Falls, boat electrofishing surveys were conducted by the Maryland Department of Natural Resources and the U.S. Fish and Wildlife Service (USFWS) between Violets Lock and Great Falls and “Widewater” downstream of Great Falls.

The collection of a single juvenile northern snakehead in the Violettes Lock to Pennyfield Lock section of the canal documented that this invasive species is now present upstream of Great Falls. With an abundance of water exchange between the Potomac and the canal, particularly during flood events when water from the canal overtops the towpath, it is nearly certain that the northern snakehead has now gained access to the nontidal Potomac River watershed.

The Maryland Department of Natural Resources is working collaboratively with



the USFWS and the National Park Service to develop northern snakehead monitoring and removal programs for the C&O Canal. The canal system is believed to offer habitat more favorable to the establishment and propagation of northern snakehead than the nontidal Potomac mainstem. Confronting and reducing northern snakehead abundance in the canal offers the best opportunity to limit emigration into the nontidal Potomac River. Manipulation of water levels, electrofishing, and increasing angler harvest through outreach are believed to be the best management options for reducing snakehead abundance in the C&O Canal. Please kill and then report any snakehead caught from the C&O Canal and the nontidal Potomac River and tributaries at fishingreports.dnr@maryland.gov. Include a photo and as much detail about the location of the catch as possible.

Flathead Catfish



Flathead catfish (*Pylodictis olivaris*) is a large predatory species with great potential to cause ecological harm through direct predation of other aquatic species and through competition for resources and habitat. Though first documented in the nontidal Potomac River in 2002, no additional flatheads were collected until 2012. However, since 2012, the abundance of flathead catfish in the Potomac has been increasing and multiple year-classes of fish have recently been identified (Figure 7). Inland

Fisheries is collecting baseline life history and diet information from all flatheads collected during annual surveys. Of the 69 flatheads collected since 2012, only 26% contained food items in their guts and most fish remains were unidentifiable. Items that have been identified include crayfish, sunfish, minnows, and catfish. Efforts are ongoing to determine what flatheads eat, how fast they grow, and how they may impact existing popular sport fisheries.

Flathead catfish are currently most abundant between Dam 5 near Clear Spring and Dam 3 near Harpers Ferry. May and June are particularly good times to target flatheads below the dams. Anglers are encouraged to harvest any flathead catfish they encounter.



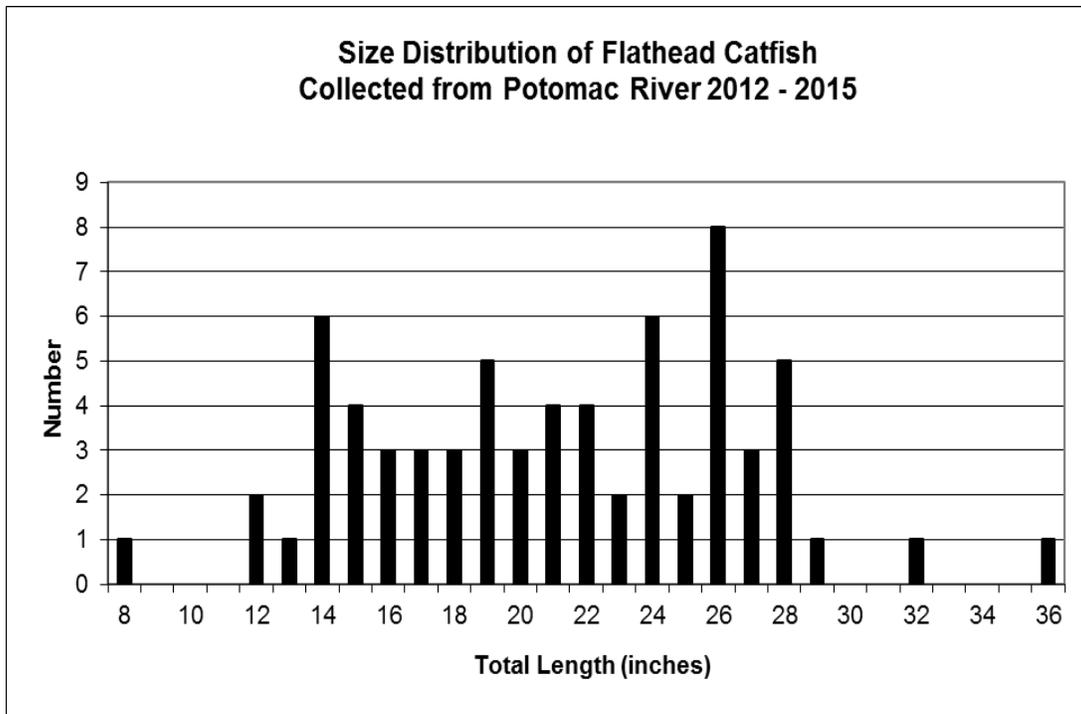


Figure 7. Size distribution of flathead catfish collected from the Potomac River during 2012 – 2015 (N = 69).

For more information or questions regarding the upper Potomac River fisheries, please contact John Mullican:

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